## REMARKS

Claims 1-14 and 16-21 are pending in the application. The Examiner has constructively elected claims 1-14 and 16 for continued prosecution and withdrawn claims 17-21 from consideration as being directed to a non-elected invention.

The status of the claims is as follows:

| Claims / Section | 35 U.S.C. Sec. | References / Notes |
|---|---|---|
| 9 | Objection | • Claim terminology |
| 1-8, 14 and 16 | §102(e) Anticipation | • Bartholomew, et al. (U.S. Patent No. 6,400,708). |
| 9-11 | §103(a) Obviousness | • Bartholomew, et al. (U.S. Patent No. 6,400,708); and<br>• Tzannes, et al. (U.S. Patent No. 6,522,666). |
| 12 & 13 | §103(a) Obviousness | • Bartholomew, et al. (U.S. Patent No. 6,400,708). |
| 17-21 | Withdrawn | • Constructively non-elected claims |

Applicants have amended claims 1, 4, 9, and 16, canceled claims 17-21, added new claims 22 and 23 for consideration by the Examiner, and have also provided discussion for distinguishing the present invention, with claims as amended, from the art cited against it.

Applicants' use of reference characters below is for illustrative purposes only and is not intended to be limiting in nature unless explicitly indicated.

## CLAIM OBJECTIONS TO CLAIM 9

*1. Applicants have amended claim 9 in accordance with the Examiner's suggestion and respectfully request withdrawal of the claim objection from the application.*

## 35 U.S.C. §102(e), CLAIMS 1-8, 14 AND 16 ANTICIPATION BY BARTHOLOMEW AND 35 U.S.C. §103(A) OBVIOUSNESS OF CLAIMS 12 AND 13 OVER BARTHOLOMEW AND OF CLAIMS 9-11 OVER BARTHOLOMEW IN VIEW OF TZANNES

SYNCHRONOUS INSERTION

Applicants have amended claims 1, 4, 9 and 16 and assert that Bartholomew fails to teach or suggest the element that data of all terminal equipment types are synchronously inserted in the common frame with a common channel for operational control.

In the OA, on pp. 3-4, under numbered paragraph 3, the Examiner stated:

> Regarding claim 1, with reference to figures 1-3, Bartholomew discloses a circuit arrangement (Fig. 2) comprising: ...
>
> -the channel bank comprising a Multiplexer/Demultiplexer 75 for inserting data of the terminal equipment (telephone 29 and computer 25), and using DS0 slots for transport over a T1 line, see column 12, lines 60-67 and column 13, lines 1-31. (Claimed insertion mechanism for inserting the data of the at least two terminal equipment types, the data of all terminal equipment types being synchronously inserted into the frame and transmitted with a digital time-division multiple access technique).

The Examiner further stated under the Response to Arguments section on pp. 9-11 of the OA, under numbered paragraph 6:

> Applicants argue on page 9, that the invention as claimed in claims 1, 2, 4 and 16, comprise "the payload (e.g. ISDN or voice) and SDSL transport mechanism are *synchronous*" (emphasis added). Examiner disagrees, because none of those alleged feature are presented in claims 1, 2,4 and 16.
>
> ...

> Applicants argue on page 11 that the inventive link exemplified by an SDLS link is **synchronous** as in claims 1, 4, 14 and 15. Examiner notes that an SDLS link is not recited in any of claims 1, 4, 14 and 15, and the SDSL is interpreted to mean symmetric DSL as indicated in claim 12. However, the feature of "synchronous" in these claims is regarded as equivalent to Bartholomew's voice and data transmissions carried in isdn frame, because it is known that DSL frames have certain number of time slots in with data! or voice can be inserted in synchrony with respect to a framing clock, so that the frame repeat every period (the period subject to standards in most of time) in order for data/and voice data to be inserted into the assigned time slots, it is in this regard that the claimed "synchronous" limitation has been interpreted by the Examiner. Applicants are encouraged to give more details about the claimed "synchronous" feature if they believe that is different from Examiner interpretation.

With regard to the non-recitation of an SDSL link in claims 1, 4, 14 and 15, the discussion with respect to these claims utilized an SDSL link for purposes of clarity, however, the claims are intended to be interpreted broadly without such a limitation. Nonetheless, with the Amendment, new claims have been added that expressly claim the common frame as an SDSL frame (new claim 22) and that this frame can contain data for an ISDN service (new claim 23)—Applicants respectfully request consideration of these new claims in the next Office Action.

Applicants provide additional detail regarding the claimed "synchronous" feature below, as requested by the Examiner.

As is well known, the basic concept of synchronization is derived from "syn" meaning together and 'chronous" meaning time. Synchronization is the process of aligning two or more periodic processes, meaning that the timing of the various services is locked or slaved to the network clock and that the various clocks in the

network are forced to operate on the same frequency. This basic concept applies to the use of the term in the present application.

The description of the present application specifies the notion of synchronous transmission (with references to page/lines):

> Finally, the object is also achieved by a method for transmitting a data stream in a frame belonging to at least one terminal equipment type, comprising the steps of synchronously inserting data of all terminal equipment types into the frame in a first unit; (2/27-28).
>
> a traditional telephony connection, instead of the ISDN connection, can be synchronously transmitted in the SDSL frame... (2/27-28).
>
> The narrow band and broadband data of the SDSL frame are transmitted synchronously in time-division multiplex between a first unit LT, a network node and the network termination NT (4/16-18).
>
> The data transmission of the data in an SDSL frame occurs synchronously in time-division multiplex. The synchronization takes place with the assistance of the SDSL clock (5/3-5).

This is what is intended with respect to the synchronization contained in present claims 1, 4, 14 and 15.

The synchronization of the payload services and the frame clock represents a special case, because typically the payload clock is not synchronized to the network clock. Although the Examiner argues that the voice and data services in Bartholomew's invention are synchronized to the clock of the ISDN frame, Bartholomew does not provide any teaching or suggestion related to such synchronization issues.

As noted in previous responses, the HDSL link as disclosed in Bartholomew is asynchronous (plesiochronous) whereas the inventive link is synchronous, and by way of example only for the broad claims, a synchronous SDSL link is explained.. This is a significant difference. The synchronization takes place with the assistance of e.g., an SDSL (or common) clock. In this way the termination equipment at both ends is in sync and, for example, the ISDN clock which becomes identical to the SDSL clock is available.

In the method specified in the HDSL standard, the synchronization signal is transmitted inside the payload. Bartholomew transmits voice-channel specific synchronization signal inside the payload, as disclosed at 9/17-20, "The switch communicates with various ISDN devices in the line using the EOC channel, for synchronization, maintenance and testing purposes."

As previously discussed, the distinction between transmission of an ISDN services and simply using the ISDN format is important. Bartholomew uses the ISDN format in order to transport compressed traditional voice service and 2 x 64 kbits/s data services transparently. However ISDN service is more than just digitized voice service. ISDN service comprises the following: 2 x 64 kbits/s B-channels for digitized voice, 16 kbits/s D-channel for higher layer signaling, control messages and a synchronous ISDN clock signal.

The present invention permits the ISDN frame to be discarded and the 2 x B voice-channels and the higher layer signaling D-channel may be transmitted as payload inside the SDSL frame. The ISON specific EOC messages can be

transmitted over the common frame, e.g., SDSL, EOC, not over the ISDN EOC, which has also been discarded.

The frame word of the ISDN frame can be eliminated in a transmission of the SDSL frame. The information contained in the overhead channel in the ISDN connection such as status information or a transmission control are already contained in the SDSL frame (page 5 lines 5-8). Hence, Bartholomew discloses the use of an ISDN physical layer, but no ISDN service, whereas the present invention permits the use of an ISDN service, but has no ISDN physical layer.

For these reasons, Bartholomew fails to teach or suggest the synchronous insertion as claimed in claims 1, 4, 14 and 15, as well as new claims 22 and 23.

DISTINCTION BETWEEN ISDN FRAMING AND ISDN SERVICE

In the OA, on p. 10, the Examiner stated:

> On page 10, Applicants argue that Bartholomew uses ISDN frame format to transmit 64 kbits/s data services and 16 kbits/s compressed voice data, and that "the payload is not an ISDN payload and therefore Bartholomew "not able to deliver ISDN service". Examiner respectfully disagrees, Applicants didn't explain why the payload of Bartholomew is not an ISDN payload however contrary to Applicants assumptions, Examiner asserts that the payload of Bartholomew are ISDN payload since the two B and D channels are used in the transmission both data and voice using an ISDN frame format.

Applicants therefore provide the following clarifying explanation of the distinction between ISDN framing and providing an ISDN service, and reassert their position that Bartholomew, while disclosing ISDN framing, does not disclose the provision of an ISDN service.

An ISDN service comprises the following: 2 x 64 kbits/s B-channels for digitized voice, 16 kbits/s D-channel for higher layer signaling, control messages and a synchronous ISDN clock signal. An ISDN service refers to higher protocol layers and it is independent from a specific data link layer. The characteristics of the ISDN B-Channel and the D-Channel (and its signaling procedures) are defined in ITU-T 1.412. (Note: An ISDN service does not require an ISDN frame as specified in ETSI TS 102 080 for transmission over the physical layer).

If ISDN services are transmitted over the telephony cable using 2BIQ modulation, ISDN frames as specified in ETSI TS 102 080 can be used. The data rate of this transmission is 160 kbits/s, where 16 kbits/s are required for the framing. The payload capacity of basic access ISDN is 144 kbits/s corresponding to 2 x 64 kbits/s (B-channel) + 16 kbits/s (D-channel).

Typically ISDN frames are used to transport ISDN service, but they can also be used for different purposes, as shown in Bartholomew's patent. Bartholomew uses the ISDN frame and the ISDN format, but, contrary to the Examiner's interpretation, does not transmit an ISDN service.

Instead of the 144 kbits/s (=2xB + D) ISDN voice service, Bartholomew uses the payload fields to transmit a different service than ISDN, namely: 16 kbits/s compressed voice (instead of the ISDN D-channel) and 2 x 64 kbits/s data services (instead of the ISDN B-channels), that fit into the ISDN frame. A D-channel is an ISDN specific signaling channel at 16 kbits/s. This channel carries the signaling according to DSS1 protocol for the calls established through the B-channels. The D-channel is specified in the ISDN standards. A 16 kbits/s compressed voice channel,

as described in Bartholomew's patent, is not a D-Channel. It only occupies the payload fields intended for the D-channel in an ISDN frame. Therefore, while Bartholomew discloses the use of an ISDN frame, it does not disclose an ISDN service because it replaces an essential element required in an ISDN service. The present invention permits the transmission of an ISDN service inside, e.g., an SDSL frame. Bartholomew uses ISDN framing for compressed voice and data transmission.

SEPARATE VS. COMMON CONTROL CHANNELS

The amendments to the claims of the present application clarify that the common frame has a common channel for operational control. This serves to further distinguish over what is taught by Bartholomew (separate control channels).

The concept of a joint operational control of payload services and the transmission frame was discussed in the Specification at 5/6-11 and 6/7-16. Namely, the Specification at 6/7-10 states:

> The operational control information of the respective ISDN connection are transmitted in the overhead OH of the SDSL frame, where this control information is divided into a part relating to the SDSL transmission path and into a further part that is dependent on one or more transmitted services.

Thus, the operational control concept is fundamentally different from that disclosed by Bartholomew. Bartholomew uses ISDN frames according to ETSI TS 101 080 containing an EOC as a transport mechanism for its payload. The functionality of this EOC only refers to the maintenance of the ISDN frames. These maintenance messages are specified in ETSI TS 101 080, A.8.3.3 and Annex A2.

This messaging channel does not have any relationship with the services transmitted within the payload. Bartholomew states, at 9/17-20:

> The switch communicates with various ISDN devices in the line, using the EOC channel for synchronization, maintenance and testing purposes.

Bartholomew's method uses a separate voice signaling channel inside the 16 kbits/s compressed voice data that is put at the place of the 16 kbits/s ISDN D-Channel. The separate voice signaling is described in Bartholomew's patent in the Abstract:

> The voice communications on the D-channel utilize in-band call set-up signaling and appropriate CODECs for digital communications compressed to the low D-channel rate.

Bartholomew goes on to state:

> The voice communications on the signaling channel utilize in-band call set-up signaling and appropriate CODECs for digital communications compressed to the low signaling channel rate. A channel bank on the network edge includes a multiplexer/demultiplexer, to combine a number of active signaling channel voice communications into one bearer channel for transport to a switch module, for example, through a DS0 to a module in an end office telephone switch (4/56-64).
>
> ...
>
> The interface 28 also performs some call-set up signaling over the D-channel, in a manner similar to a portion of the D-channel signaling performed by the TAU 15. In particular the interface 23 sends and receives normal D-channel signaling relating to line states, e.g. off-hook, ringing, ring-tip, on-hook, etc. However in the presently preferred embodiment, once the interface 28 has signaled seizure of the D-channel on the line 11, the interface provides a pass-through for the other signaling to and from the telephone 29. For example on an

> outgoing call, the interface 23 detects an off-hook by the telephone 29. The interface signals this condition over the line and establishes a channel to the switch 37. The switch sends dial-tone in band, and the interface 28 passes the dial-tone signal to the telephone 29 for presentation to the caller (7/45-59).

These excerpts from Bartholomew's patent description show that the EOC inside the ISDN frame is only used for maintenance purposes of the transmit medium. Whereas the services inside the payload, the 16 kbits/s compressed voice and the 2 x 64 kbits/s data are independent of the ISDN frame and they use independent signaling channels. The voice signaling is carried inside the 16 kbits/s compressed voice channel. Bartholomew discloses one EOC link for each service which are transmitted in parallel. *"The EOC and 0 channels are combined on another DSO within the T1 link."* (Bartholomew 9/7-9, 17-20, 9/49-10/3 and 10/51-54).

The EOC in Tzannes' patent is only specified for use of signaling for the transmit medium. It is not shared with the payload services.

As previously stated, claims 5 and 9 address the fact that payload voice services (ISDN, digitized voice) and the transmit medium SDSL share only one EOC inside the common (e.g., SDSL) frame. As described in Bartholomew and discussed above, each service and the transport medium have their own EOCs which are each realized as a separate bitstream. The EOCs of the voice service are carried separately in the payload, whereas the control according to the present claims, as amended, utilizes an embedded operating channel that is distinguished

from that of Bartholomew. The assignment of the logic EOC channels between the terminations may be made via addressing (original claim 11).

Therefore, Bartholomew, even in combination with Tzannes, fails to teach or suggestion a common frame with a common channel for operational control, as required by the claims of the present application.

Applicants note, as in previous responses, that the invention is not intended to broadly cover the general concept of multiplexing of voice and other data into a DSL link, nor does it broadly cover the eoc signaling channel per se. Instead the invention relates to synchronous transmission of voice and data over a common frame, e.g., SDSL, where all payload services (e.g., ISDN, voice, data) and the transport mechanism share the same overhead infrastructure (synchronization and, e.g., eoc signaling channel).

The present Specification addresses a system that is capable of transmitting multiplexed voice and data services over a DSL link. The Specification (p. 1) briefly describes state-of-the-art techniques. In lines 23-30 and in Figure 2 the transport of ISDN voice services and broadband data over an HDSL link (see ETSI HDSL Standard TS 101 135, Section 7.7, pp. 111-117, November 1998) is referred to. This standard specifies how an ISDN channel (2 B + D) and 2048 kbits/s broadband data are multiplexed into HDSL frames. Bartholomew also discloses using a method for multiplexing data and voice services into a DSL link. But there are significant differences between Bartholomew's method in the HDSL standard and the present invention.

Annex 7.7 of the HDSL standard and the present invention describe different methods for transmission of broadband data and ISDN service over a HDSL or SHDSL link using a multiplexing method. Bartholomew uses the ISDN frame format to transmit 64 kbits/s data service and 16 kbits/s compressed voice data, but the payload in Bartholomew's system is not an ISDN payload. Bartholomew's system is therefore not able to deliver ISDN service. The system of the present invention is designed to be capable of transmitting ISDN service and/or a traditional voice service.

All services transmitted according to the present invention operate synchronously (see section III), whereas the HDSL link is asynchronous (plesiochronous) asynchronous. In Bartholomew, the voice services transmitted over the ISDL and the T1 are not synchronized.

With respect to claims 9-11, the control channel for the service transmitted as payload (ISDN, voice) is arranged outside the payload region in the frame overhead. Multiple payload services and the SDSL transport mechanism share only one EOC, which is, e.g., the SDSL EOC. The Specification states, *"The bandwidth of the payload data can be expanded by relocation of operational bits"* into the frame (page 2 lines 25, 26). In contrast to this method, for the above described ISDN transport over HDSL, its own signaling channel is set up inside the payload.

According to the claims in the present invention, instead of setting up a separate and appertaining signaling channel in the payload region for each voice channel, as it is done in Bartholomew or in the HDSL standard, different services

share the common frame, e.g., SDSL, EOC. This means that the signaling of the payload (ISDN or traditional voice service) shares the control channel of the transport mechanism (SDSL). This control channel is in the frame and not in the payload (Specification at 5/6-11; 6/7-16).

In these appertaining claims of the present invention, the EOC channels are not multiplexed into timeslots. Instead there are only logic channels where the assignment of the messages to the respective recipients is made via addresses in the messages.

For the above reasons, the Applicants assert that the amended claim language clearly distinguishes over the prior art, and respectfully requests that the Examiner withdraw the 35 U.S.C. §§102, 103 rejections from the present application.

## CONCLUSION

Inasmuch as each of the rejections have been overcome by the amendments and arguments presented, and all of the examiner's suggestions and requirements have been satisfied, it is respectfully requested that the present application be reconsidered, the rejections be withdrawn and that this application be passed to issue.

Respectfully submitted,

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